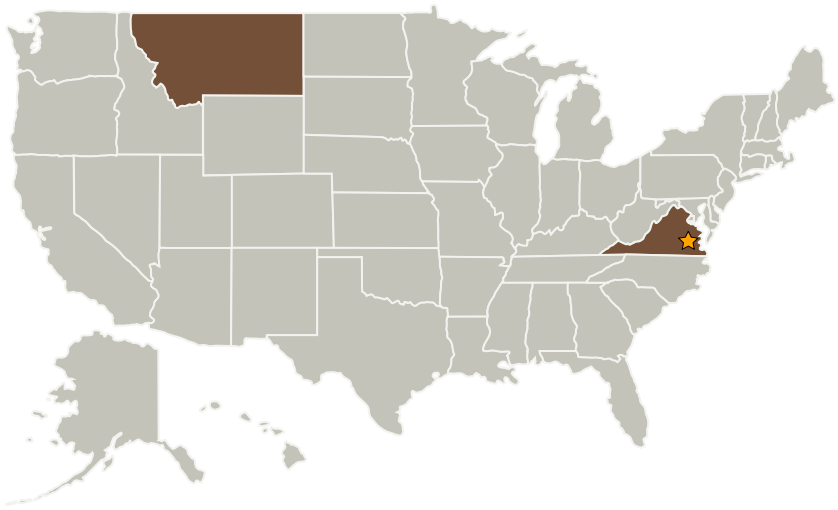
Monolithic micro-laser with KTP ridge waveguides for injection seeding high power lasers, Phase I

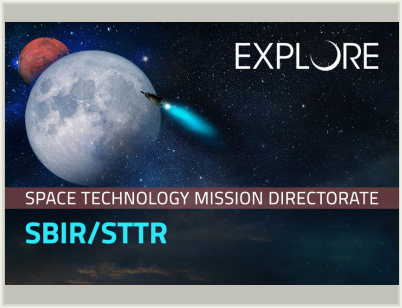
Completed Technology Project (2004 - 2004)

Project Introduction

This NASA Small Business Innovation Research Phase I project will develop a technique to greatly improve the direct coupling of a diode laser to an optical waveguide with embedded Bragg grating using no intermediate lenses. The key innovation proposed for this SBIR effort is a method for generating adiabatic tapers at the input end of optical waveguides in potassium titanyl phosphate (KTP). This innovation will significantly reduce the size, weight and complexity of the Bragg stabilized laser directly addressing NASA?s need for a compact, rugged, electrically efficient, tunable laser for injection seeding high power lasers for lidar. By injecting the output of the single-frequency, cw, seed laser source into a high power laser, such as a Q-switched Nd:YAG laser, longitudinal mode beating is eliminated that can cause random shot-to shot intensity fluctuations and excessive intra-cavity intensities that damage the internal optics in the laser cavity. The seed laser also enables high frequency stability and spectral purity from the high power host laser required by Doppler wind and atmospheric molecular lidar. A compact, robust seed laser is a critical component to extend the lifetime and achieve high frequency stability of high power laser systems used for lidar applications.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
ADVR, Inc.	Supporting Organization	Industry	Bozeman, Montana

Primary U.S. Work Locations	
Montana	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Switzer Gregg

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers